Control Number: 50595

Item Number: 188

Addendum StartPage: 0

50595

To: PUC

Re: Link to HB4150 Training – Narrated Video of Training For Bandera Electric Cooperative (example of HB4150 Training prepare by Schneider Engineering)

Date: April 20, 2021

https://schneidereng-my.sharepoint.com/:p:/g/personal/nbrown_se-texas_com/EYSOvbb0vEVAhnnaSrCdD4kBwzOap6Hm0Uxd0ZJ91AYQMg?e=CQz5Wd

Arthur C. D'Andrea
Chairman

Greg Abbott
Governor

Thomas J. Gleeson
Executive Director

Public Utility Commission of Texas

April 5, 2021

Steve Moffitt
Vice President, Consulting Services
Schneider Engineering LTD
191 Menger Springs Parkway
Boerne, TX 78006

Dear Mr. Moffitt,

Attached to this letter is a list of municipally owned electric utilities and electric cooperatives which, as a part of their compliance filings under 16 TAC § 25.97(d), indicated that your firm provided hazards recognition training and training on National Electric Safety Code standards for line construction as part of a single HB 4150 compliance training class. These utilities filed largely identical responses in Project No. 50595, *Training Reports for Line Inspection and Safety*. For the Commission to determine whether their responses satisfy the requirements of the rule, the Commission requests Schneider Engineering provide responses to the following:

1. Was the HB 4150 compliance training designed as a one-time course, an ongoing continuing education course, or another type of course? Please explain.

2. Please provide a more complete summary of the topics covered and materials used in the HB 4150 compliance training sessions.

Your response to these questions should be filed in Project No. 50595 no later than April 20, 2021. Should your response vary based on the utility for which the training was provided, please clearly indicate those differences.

Should you have any questions, please do not hesitate to contact Davida Dwyer, Director of Enforcement.

Sincerely,

Thomas Gleeson
Executive Director

List of utilities attending Schneider Engineering's HB 4150 compliance training:

Bandera Electric Cooperative
Bartlett Electric Cooperative
Bluebonnet EC
City of Bartlett
City of Bastrop
City of Boerne
City of Bowie
City of Brenham
City of Bridgeport
City of Burnet
City of Castroville
City of Cuero
City of Farmersville
City of Flatonia
City of Fredericksburg
City of Georgetown
City of Goldsmith
City of Gonzales
City of Kirbyville
City of Lampasas
City of Llano
City of Moulton
City of Newton
City of Robstown
City of San Marcos
City of Schulenburg
City of Seguin
City of Shiner
City of Weatherford
Fayette Electric Cooperative
Floresville Electric L&P
Garland Power & Light
Jackson Electric Cooperative
Karnes Electric Cooperative
Kerrville Public Utility Board
Magic Valley Electric Cooperative
New Braunfels Utilities
Rio Grande Electric Cooperative
San Bernard Electric Cooperative
San Patricio Electric Cooperative
Victoria Electric Cooperative
Wharton County Electric Cooperative

City of BRENHAM

HB4150 COMPLIANCE TRAINING

HB 4150 REVIEW - NESC REVIEW - HAZARD RECOGNITION

PREPARED BY SCHNEIDER ENGINEERING, LTD

SCHNEIDER ENGINEERING
ENERGY FOCUS COMMITMENT.

NOTES REGARDING THIS PRESENTATION

- **Schneider Engineering, Ltd. is pleased to provide this training to City of Brenham (COB) personnel** as part of an effort to comply with the PUCT rule implementing HB 4150, the line inspection and safety legislation signed into law following the 86th legislative session (2019).
- One aspect of the PUCT rule, is that it establishes **new reporting requirements applicable to electric utilities operating in Texas. The initial due date for all reports (applicable to COB) is May 1, 2020.**
- The reporting requirements include **one-time Reports on Training Documents and Programs. All owners of transmission and distribution facilities must file**:

  (1) **a summary description of hazard recognition training documents** provided to employees related to overhead transmission and distribution; and

  (2) **a summary description of training programs provided to employees related to the National Electric Safety Code (NESC) for construction of transmission and distribution lines**.

- **This presentation is intended for the use of COB** and should not be shared outside of the COB organization and authorized COB contractors.
- **The information in this presentation is for training purposes.** Any questions regarding the content of this training and the safety rules, engineering practices or construction and maintenance of COB facilities, should be referred to your Supervisor or Manager for any clarification or further information.

City of BRENHAM

TRAINING AGENDA

- **Part 1: HB4150 Review**
  - What is HB4150?
  - Who does this new law apply to?
  - What do electric utilities need to do to attain compliance?
- **Part 2: NESC Refresher**
  - What is NESC?
  - Why NESC is important?
  - Important NESC Terms
  - Top code violations
  - Benefits of following the rules
  - NESC rule overview
  - Vertical clearances
- **Part 3: Hazard Recognition**
  - Determining what constitutes a hazard (or hazards)
  - Evaluating and Reporting a hazard (or hazards)

PART 1 – HB4150 REVIEW

WHAT IS HB4150?

House Bill 4150: William Thomas Heath Power Line Safety Act amends current law relating to safety and inspection requirements for certain utilities that provide electricity. It requires those Utilities to make regular inspections of **power lines over lakes** to ensure high-voltage carriers comply with state and federal height and safety regulations.

- The law has other inspection, training and reporting provisions that apply to all T&D utilities in Texas.
- As the name implies – this law was enacted as a result of an accident involving three Boy Scouts that were electrocuted in 2017, when the mast of their catamaran contacted a power line.

City of BRENHAM

DETAILS OF HB4150

- Applies to electric utilities, **Electric Cooperatives**, and **Municipally-Owned Utilities that own or operate overhead transmission and / or distribution assets**
- **T&D lake crossing clearances over designated lakes -- must meet NESC Rule 232**
- Requires **training and reporting**

What is HB4150?

House Bill 4150: William Thomas Heath Power Line Safety Act amends current law relating to safety and inspection requirements for certain utilities that provide electricity. It requires those Utilities to make regular inspections of power lines over lakes to ensure high-voltage carriers comply with state and federal height and safety regulations.

This bill comes upon a tragedy of three Boy Scouts that were electrocuted in 2017 when the mast of their catamaran contacted a power line.

Who Does this Bill Apply To?

This bill applies to electric utilities, Municipally-Owned utilities, and Electric Cooperatives that own or operate overhead transmission and/or distribution assets.

What Reporting is Required?

EMPLOYEE TRAINING REPORT | DUE: MAY 1ST 2020*

Reporting	Applies to
▪ Summary of Hazard Recognition Training Program ▪ Summary of NESC Training Program	Transmission and Distribution

FIVE-YEAR REPORT | DUE: MAY 1ST 2020* (EVERY FIVE YEARS)

Reporting	Applies to
▪ Percentage of Facilities Inspected	Transmission > 60kV Only

ANNUAL REPORT | DUE: MAY 1ST 2020* (ANNUALLY)

Reporting	Applies to
▪ Fatalities or Injuries and Corrective Actions	Transmission > 60kV and Distribution > 1kV
▪ Occurrences of Non-Compliance ▪ Knowledge of Non-Compliance ▪ Knowledge of Violations of Easement Agreements	Transmission > 60kV Only

** Dates are tentative pending rule finalization.*

LET US HELP YOU MANAGE HB4150

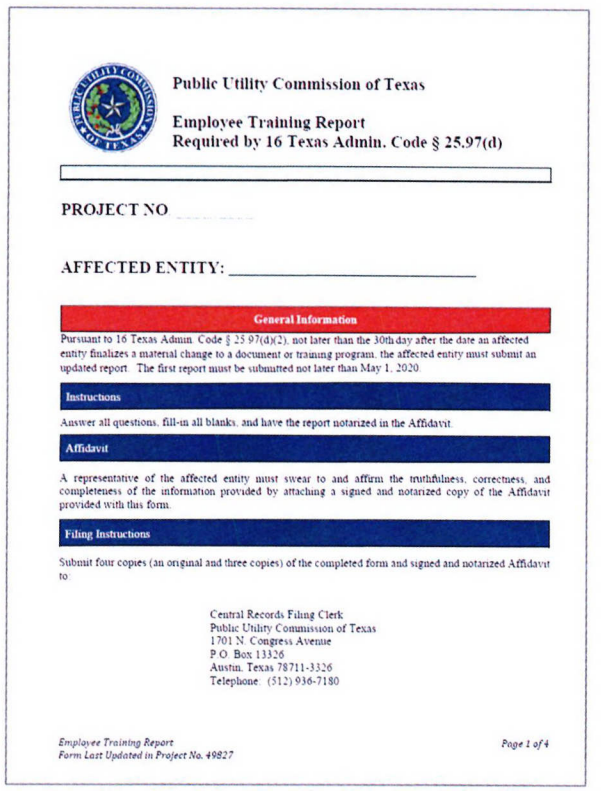
Contact us at: 830.249.3887

SCHNEIDER ENGINEERING
ENERGY. FOCUS. COMMITMENT.

City of BRENHAM

HB4150 PUCT REPORTING

1. **Employee Training Report** (Transmission and Distribution)
2. **Annual Report – Fatalities and Injuries** (Transmission and Distribution)
   - Fatalities or Injuries and Corrective Action Plans
3. **Annual Report – Occurrences & Knowledge of Non-Compliance** (Transmission Only)
   - Occurrences of Non-Compliance
   - Knowledge of Non-Compliance
   - Knowledge of Violation of Easement Agreements
4. **Five Year (Inspection) Report** (Transmission Only)



Public Utility Commission of Texas

Employee Training Report
Required by 16 Texas Admin. Code § 25.97(d)

PROJECT NO

AFFECTED ENTITY: _____

General Information

Pursuant to 16 Texas Admin. Code § 25.97(d)(2), not later than the 30th day after the date an affected entity finalizes a material change to a document or training program, the affected entity must submit an updated report. The first report must be submitted not later than May 1, 2020.

Instructions

Answer all questions, fill-in all blanks, and have the report notarized in the Affidavit.

Affidavit

A representative of the affected entity must swear to and affirm the truthfulness, correctness, and completeness of the information provided by attaching a signed and notarized copy of the Affidavit provided with this form.

Filing Instructions

Submit four copies (an original and three copies) of the completed form and signed and notarized Affidavit to:

Central Records Filing Clerk
Public Utility Commission of Texas
1701 N. Congress Avenue
P.O. Box 13326
Austin, Texas 78711-3326
Telephone: (512) 936-7180

Employee Training Report
Form Last Updated in Project No. 49827

Page 1 of 4

EMPLOYEE TRAINING REPORT
TRANSMISSION AND DISTRIBUTION

- **One-time reporting requirement**
- **Description of hazard recognition** training of overhead distribution and transmission facilities
- **Description of training related to the National Electrical Safety Code** (NESC) for construction of distribution and transmission lines
- **Due May 1st, 2020**

ANNUAL FATALITIES OR INJURIES REPORT

- **Applies to both overhead transmission and distribution facilities**
- **Report number of fatalities and Injuries that occurred to the general public when overhead electrical equipment and lines did not meet minimum vertical clearance as stated in NESC**
- **Does not apply employees, contractors**, etc.
- **Natural disaster, weather, man-made act or force outside a utilities control are not included**
- **Corrective Action Plan to prevent reoccurrences**
- **Due May 1st, 2020**

City of BRENHAM

OCCURRENCES OF NON-COMPLIANCE REPORT TRANSMISSION >60KV ONLY

- **Applies to transmission facilities greater than 60kV**
- **Occurrences of Non-Compliance** – how often (number) of times vertical clearances were not met
- **Knowledge of Non-Compliance** – did the utility know any vertical clearances were not in compliance? Yes or No? (not how often)
- **Knowledge of Violation of Easements** - did the utility know any vertical clearances with the U.S Army Corps of Engineers were not in compliance? Yes or No? (not how often)
- **Due May 1st, 2020**

City of BRENHAM

FIVE-YEAR REPORT
TRANSMISSION >60KV ONLY

- **Applies to transmission facilities greater than 60kV**
- **Percentage of transmission inspected related to vertical clearance** as stated in NESC
- **No minimum percentage required**
- **Due May 1st, 2020 – every 5 years**

PART 2 – NESC REFRESHER

WHAT IS NESC?

- **National Electric Safety Code** (NESC)
- Prepared in conjunction with IEEE (Institute of Electrical and Electronic Engineers)
- Eight volunteer **subcommittees containing utility engineers, manufacturers, consultants**, etc. with an executive subcommittee and interpretations subcommittee
- **Code cycle** reviewed and **updated every 5 years**
- **Rule-making** process **open to the public**
  - Submit new rules/ recommendations via the web
- **A performance code – for the electric utility industry—plus other sectors**
- **What to do**... NOT... **How to do**
- Basic **requirements for construction** – NESC and RUS
- If Non-RUS, **NESC and Company Construction Standards**
- **Practical safeguard** of persons (workers and public)

WHY IS NESC IMPORTANT? SAFETY

- Rules and Regulations are designed to **ensure worker and public safety**
- Rules and Regulations—Come From:
  - NESC
  - State Requirements
  - Contractual Obligations
  - Company Standards

City of BRENHAM

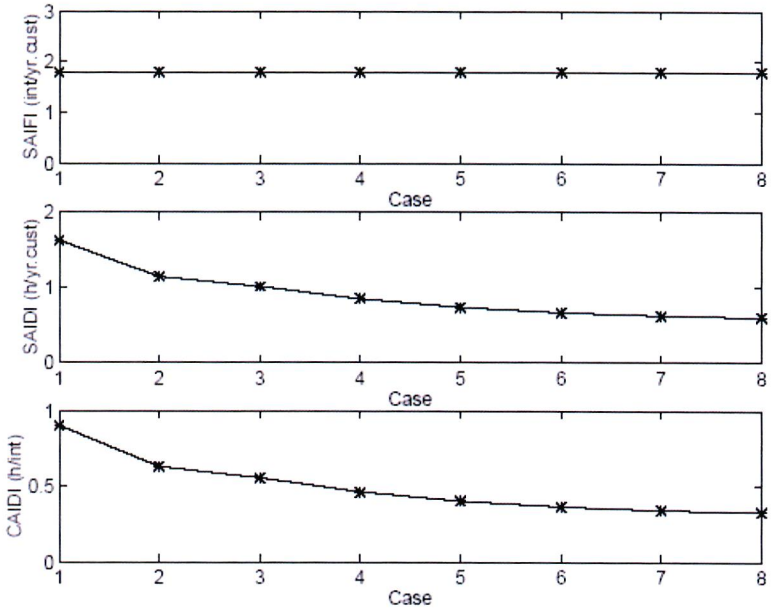
WHY IS NESC IMPORTANT? RELATIONSHIPS

- **Governance boards** (county commissioner / city council)
- **Pole owners** (utility)
- **Joint occupancy tenants** (communications, etc.)
- Your **supervisor / managers**
- Your **work group / team / crews**

City of BRENHAM

WHY IS NESC IMPORTANT? RELIABILITY

- **Proper construction standards** result in good reliability
- **Non-conforming construction and low service drops** – result in low reliability
- **Pole owner** – in some situations has the right to remove a drop that is in violation



City of BRENHAM

WHY IS NESC IMPORTANT? RISK / LOSS MANAGEMENT

- **Cost** of accidents
- **Cost** of fines (OHSA) per offense
- **Cost** of re-inspections
- **Cost** of repairs or replacements
- **These types of costs impact the financial performance of your utility**

City of BRENHAM

BENEFITS OF FOLLOWING THE NESC - SUMMARY

1. **Safety** to you, your co-workers and the public
2. **NESC provides foundation for many types of relationships** with Boards; Pole Owners / Joint Use Tenants; Utility Managers; Your Crews / Work Teams
3. **Improve System Reliability** which translates to Customer Satisfaction
4. **Stronger financial position and Reduced operating costs**

Do it right the first time.

If you find a violation – fix it or report it!

City of BRENHAM

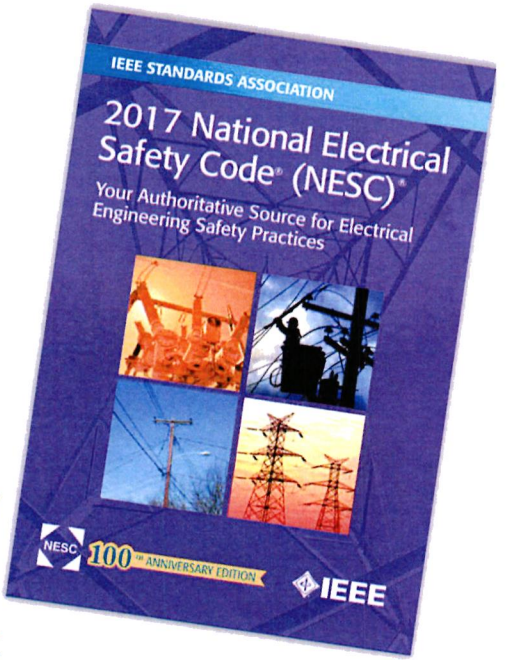
QUALIFIED PERSONNEL

- **Qualified Personnel** - Employees having been trained and demonstrate adequate knowledge of equipment and hazards to efficiently do their duties

City of BRENHAM

TOP CODE VIOLATIONS

- **Vertical clearance;** the rationale behind HB4150—Vertical clearance problems and conditions can occur during construction or slowly over-time
- **Service drop clearances**; the most common violation of NESC —often resulting in home package delivery services pulling down the service drop
- **Bootleg Attachments;** this typically involves a communications company attaching to a utility guy rod not rated for the additional tension
- **Climbing spaces;** inadequate pole room to navigate & mount equipment
- **Grounding;** faulty grounding and electrolysis causing destructive corrosion



City of BRENHAM

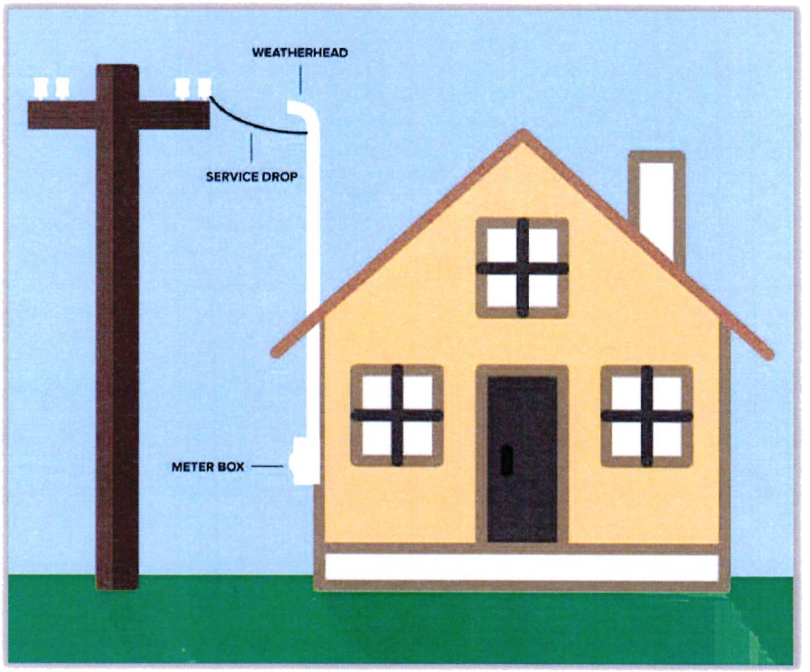
NESC SECTION 1 - 010. PURPOSE

- ✓ The purpose of these rules is **the practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines** and associated equipment.
- ✓ These rules contain the **basic provisions that are considered necessary for the safety of employees and the public under specified conditions**.
- ✓ This code is **not intended as a design specification or as an instruction manual**.

City of BRENHAM

NESC SECTION 1 - 011. SCOPE

- **NESC covers to service point of Co-op's point of demarcation[1].**
- NEC code is applied from this point on.
  - **[1]Point of connection between utility and premises wiring**
- **Weatherhead** on overhead service
- **Meter base** on underground service



City of BRENHAM

NESC SECTION 1 - 012. GENERAL RULES

The utility performing design, construction operation, **or** maintenance tasks for electric supply or equipment covered by this Code **shall be responsible for meeting the applicable rules.**

- **All qualified personnel at the utility are responsible** for meeting the requirements of the rules

THIS MEANS YOU

City of BRENHAM

NESC SECTION 1 - 013. APPLICATION - EXISTING FACILITIES

- **Existing facilities need not comply with new code**
- **When modifying existing facilities**:
  1. Meet code when structure was originally built
  2. Meet code that applied to structure when previous modification/upgrades were completed, or
  3. Met the 2017 NESC Code
- **The 2017 NESC added reference to Rule 202 which requires Rule 238C be met when pole replaced** (Meet the 40-inch separation between power and communications)

City of BRENHAM

NESC SECTION 1 -013. APPLICATION 013C. INSPECTION AND WORK RULES

- New to the 2017 NESC
- **"Inspection rules and work rules in the current edition of the NESC shall apply to inspection of or work on all new and existing installations."**

City of BRENHAM

SECTION 23 - RULE 232. CLEARANCES (APPLIES TO HB4150)

- **Vertical clearances of wires, conductors, cables, and equipment aboveground, roadway, rail, or water surfaces**
  - Vertical clearances for wires as shown on Table 232-1
    - Separate tables for Metric (m., page 99) and English (ft., page 103)
  - Vertical clearances for equipment as shown on Table 232-2
    - Separate tables for Metric (m., page 107) and English (ft., page 110)

SECTION 23 - RULE 232B4. STREET AND AREA LIGHTING

- Vertical clearances as shown on Table 232-2
- Grounded luminaire considered an "effectively grounded" equipment case
- Ungrounded luminaire considered a "rigid live part"
- Exception: post-mounted luminaire with grounded or entirely dielectric cases

City of BRENHAM

SECTION 23 - RULE 233. CLEARANCE BETWEEN WIRES, CONDUCTORS, AND CABLES ON DIFFERENT STRUCTURES

- 233A (General) - Crossing to be made on a common support structure, where practicable. Where not practical, follow Rule 233B and C.
  - 233B1 - Horizontal distance – no less than 5 feet.
  - 233C1 – Vertical Clearance – shall not be less than that shown in Table 233-1

DISTRIBUTION VERTICAL CLEARANCES TABLE 232-1

Primary Conductors 14.4/24.9 kV

Vertical Clearances (feet)

All clearances are with conductors under maximum sag conditions. (See sag charts)

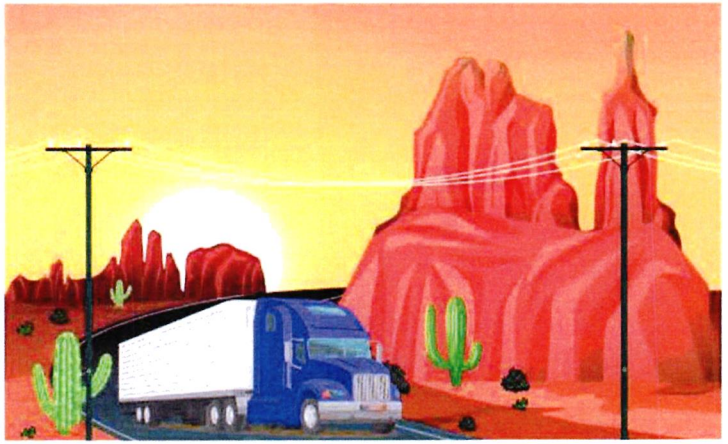
1	Railroads	Phase	26.5 (NESC)
		Neutral	23.5 (NESC)
2	Public streets, alleys, roads	Phase	18.5 (NESC)
	Not TXDOT controlled	Neutral	15.5 (NESC)
	TXDOT controlled	All Conductors	22.0 (State)
3	Commercial driveways, parking	Phase	18.5 (NESC)
	lots, and other areas subject to	Neutral	15.5 (NESC)
	truck traffic.		
4	Residential driveways	Phase	18.5 (NESC)
		Neutral	15.5 (NESC)

DISTRIBUTION VERTICAL CLEARANCES TABLE 232-1

5	Other land traversed by vehicles such as cultivated, grazing, forest, orchards, industrial and commercial sites etc.	Phase Neutral	18.5 (NESC) 15.5 (NESC)
	When designing a line where oversized vehicles, equipment is in use, these clearances shall be increased by the difference between 14' and the height of the equipment. This includes oil field equipment.		
6	Water areas not suitable for sail boating	Phase Neutral	17.0 (NESC) 14.0 (NESC)
7	Water areas for sail boating including lakes, ponds, and rivers.		
	a. Less than 20 acres	Phase Neutral	20.5 (NESC) 17.5 (NESC)
	b. 20 to 200 acres	Phase Neutral	28.5 (NESC) 25.5 (NESC)
	c. Over 200 to 2,000 acres	Phase Neutral	34.5 (NESC) 31.5 (NESC)
	d. Over 2,000 acres	Phase Neutral	40.5 (NESC) 37.5 (NESC)

DISTRIBUTION VERTICAL CLEARANCES

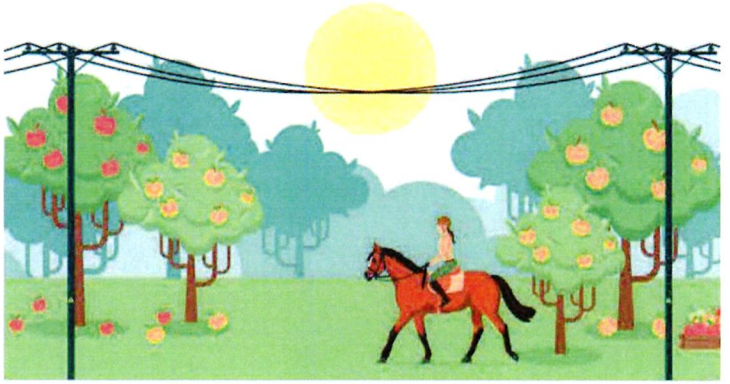
TRUCKS OVER 8 FEET



Vertical Clearance at Largest Vertical Sag							
Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
15.5 ft.		16.0 ft.	18.5 ft.				

Department of Transportation may require greater clearance.

OVER FIELDS, ORCHARDS, FOREST, ETC.



Vertical Clearance at Largest Vertical Sag							
Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
15.5 ft.		16.0 ft.	18.5 ft.				

Used by vehicles over 8 feet tall or riders on horseback.

City of BRENHAM

DISTRIBUTION VERTICAL CLEARANCES

RAILROADS

Vertical Clearance at Largest Vertical Sag

Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
23.5 ft.		24.0 ft.	26.5 ft.				

Railroad company may require greater clearance.

VEHICLES GREATER THAN 14 FT. IN HEIGHT

Vertical Clearance at Largest Vertical Sag

Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
X + 1.5 ft.		X + 2 ft.	X + 4.0 ft.				

X = Height of oversized vehicle.

City of BRENHAM

DISTRIBUTION VERTICAL CLEARANCES

WATER (NO SAILBOATS)

Vertical Clearance at Largest Vertical Sag

Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
14.0 ft.		14.5 ft.	17 ft.				

WATER (FOR SAILBOATING)

Vertical Clearance at Largest Vertical Sag

	Neutral or Comm.	Grounded Span Guy	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
<20 Acres	17.5 ft.		20.5 ft.				
20-200 Acres	25.5 ft.		28.5 ft.				
>200-2,000 Acres	31.5 ft.		34.5 ft.				
>2,000 Acres	37.5 ft.		40.5 ft.				

City of BRENHAM

City of BRENHAM

PART 3 – HAZARD RECOGNITION

FOR INSTALLATION AND MAINTENANCE OF OVERHEAD ELECTRIC SUPPLY AND COMMUNICATION LINES

City of BRENHAM

WHAT IS AN ELECTRICAL HAZARD?

"A dangerous condition where a person can or does make electrical contact with energized equipment or a conductor. From that contact, the person may sustain an injury from shock, where there is a potential to receive an arc-flash burn, thermal burn, or blast injury."

Engineers, electricians, and overhead line workers are at the top of the list of professionals who are most exposed to electrical hazards.

However, electrical hazards can come in all forms (low voltage, i.e. behind the meter) and people who are indirectly working with electricity are also exposed to electrical hazards.

HAZARD CATEGORIES

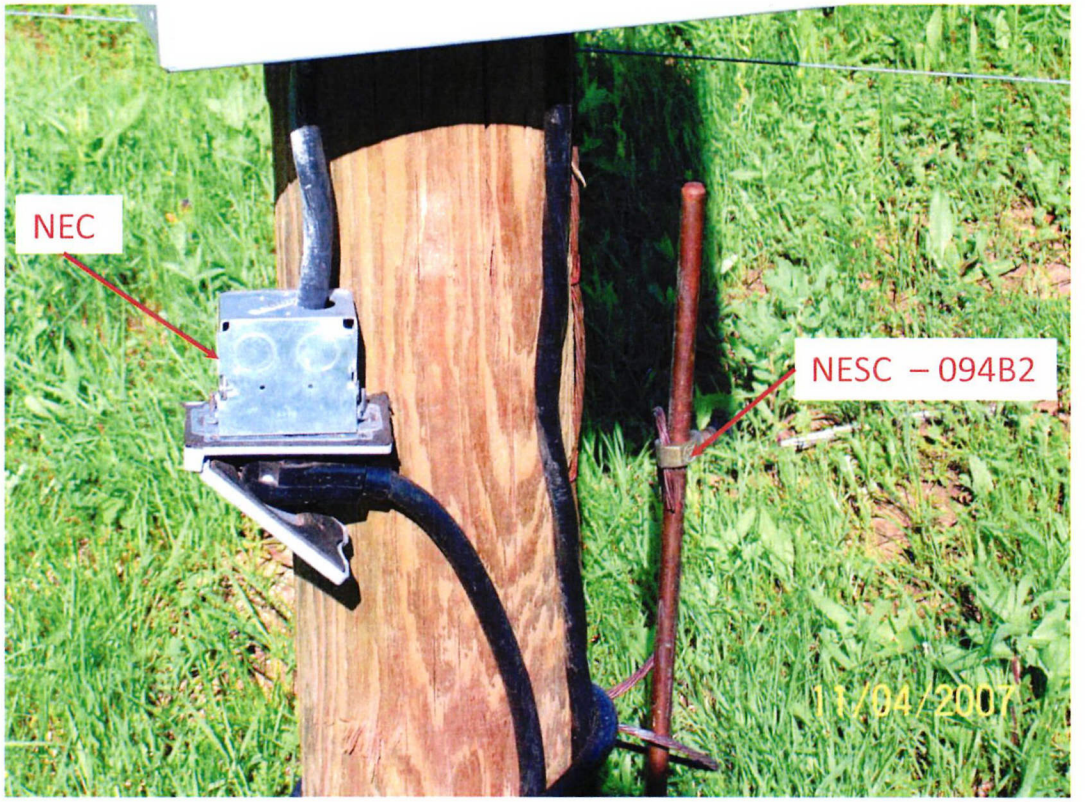
- Lack of clearance
- Damaged / Misuse of equipment
- Inadequate wiring and overloaded circuits
- Exposed electrical parts
- Improper grounding
- Damaged insulation
- Personal Protective Equipment (PPE)
- Weather / Wet conditions

City of BRENHAM

FIND THE CODE VIOLATION

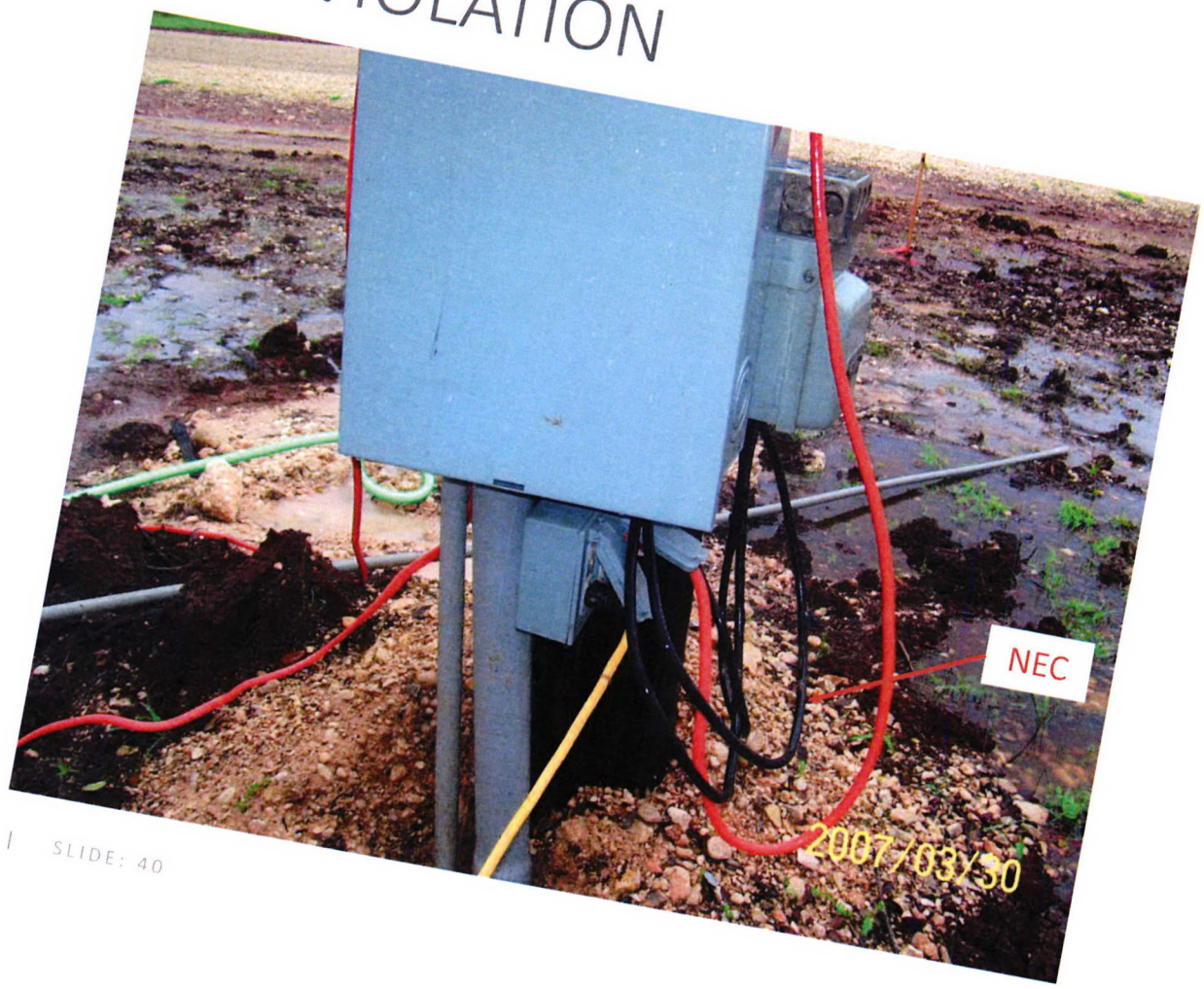
City of BRENHAM

FIND THE CODE VIOLATION



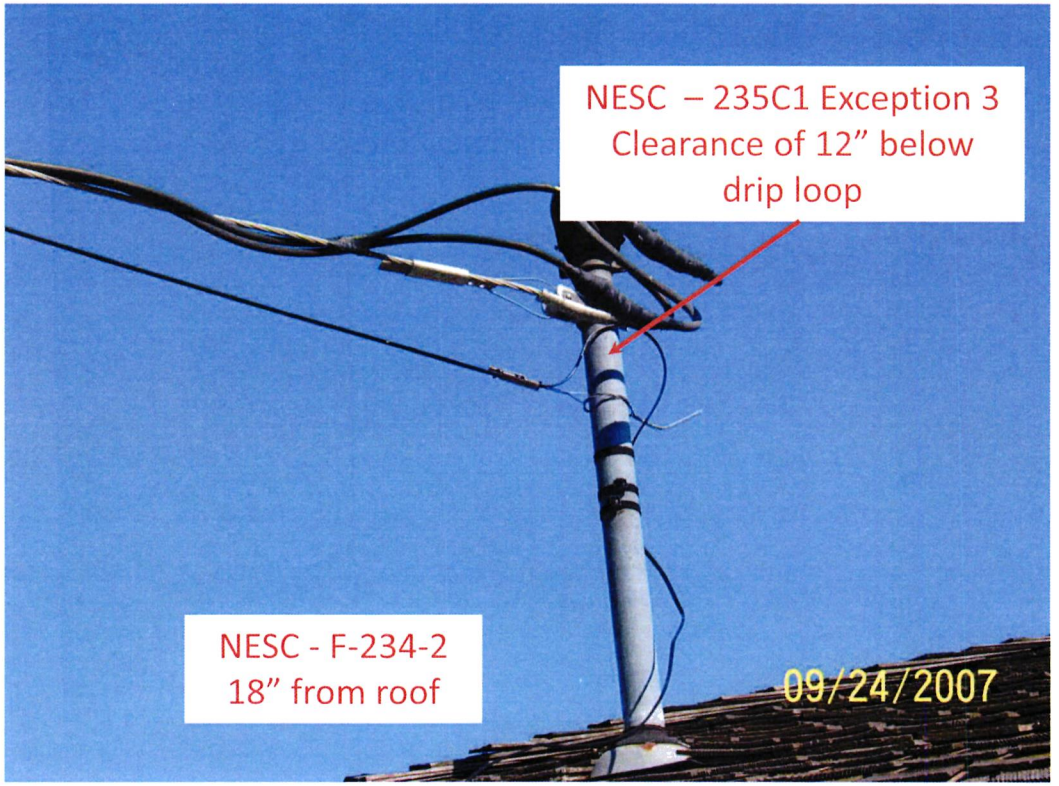
City of BRENHAM

FIND THE CODE VIOLATION



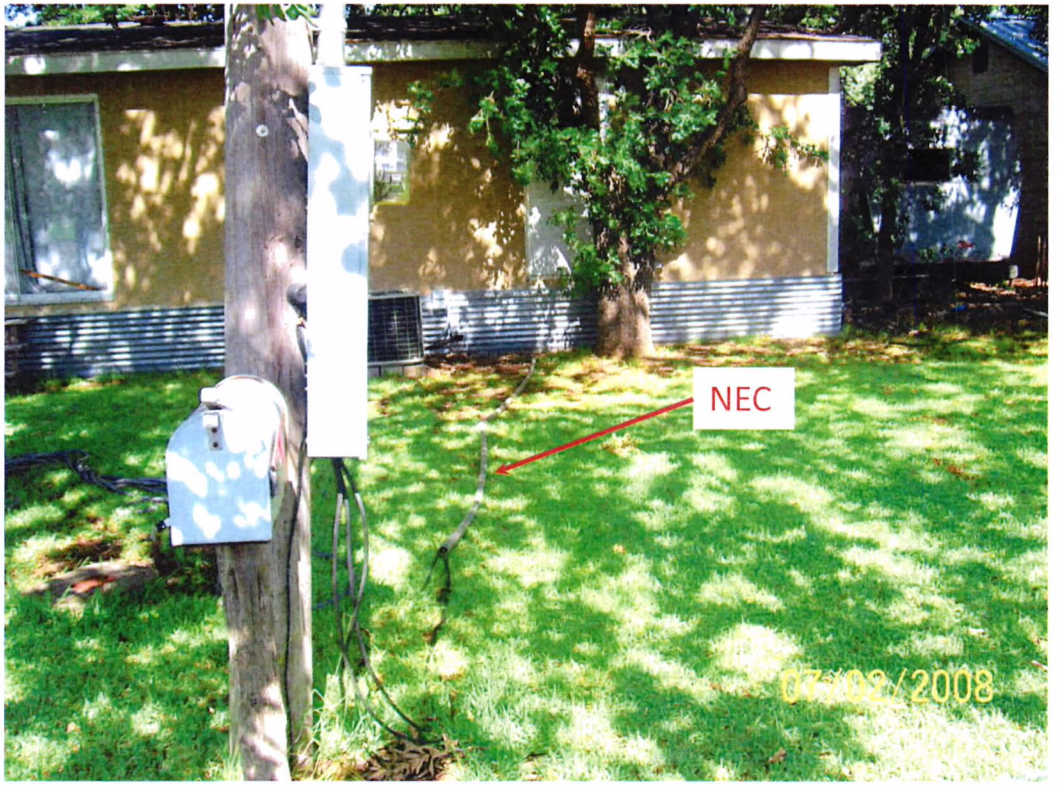
City of BRENHAM

FIND THE CODE VIOLATION



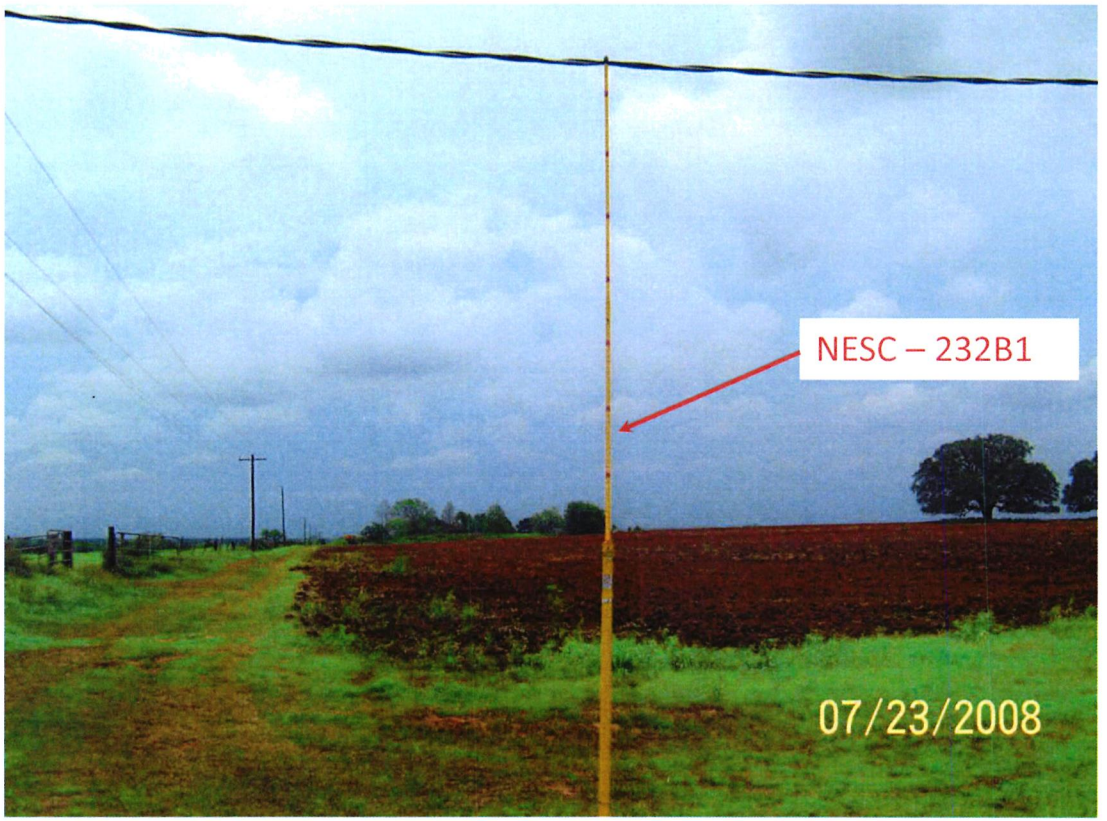
City of BRENHAM

FIND THE CODE VIOLATION



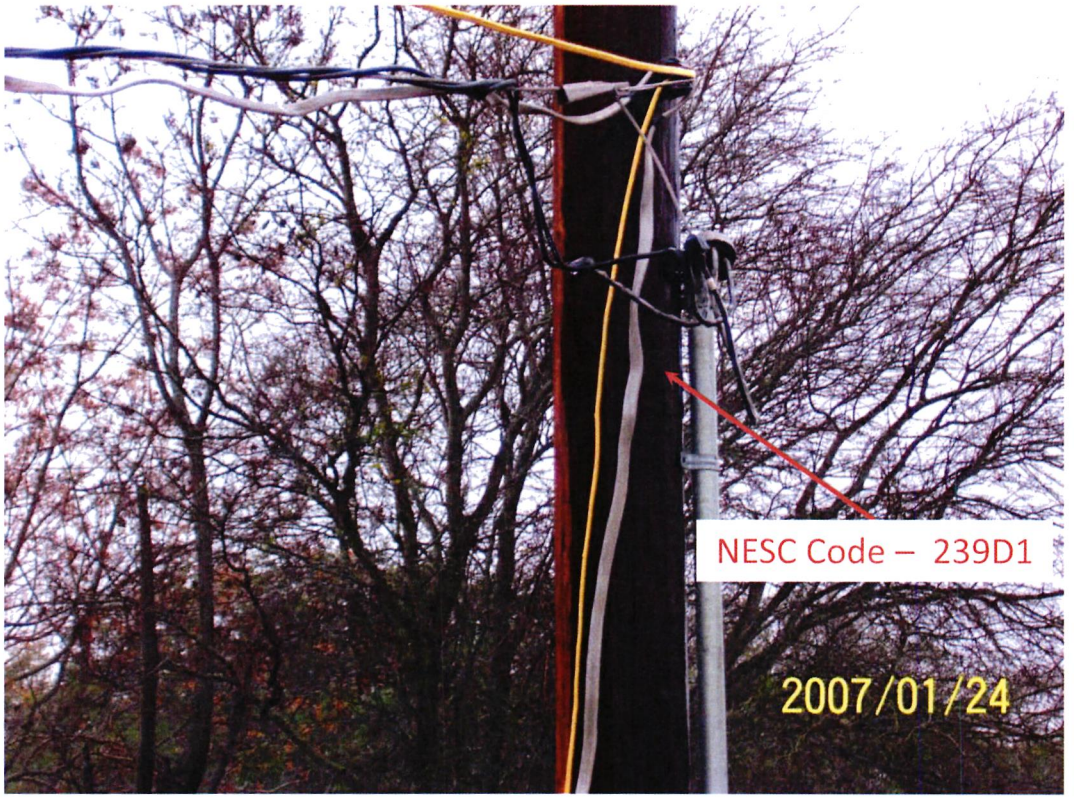
City of BRENHAM

FIND THE CODE VIOLATION



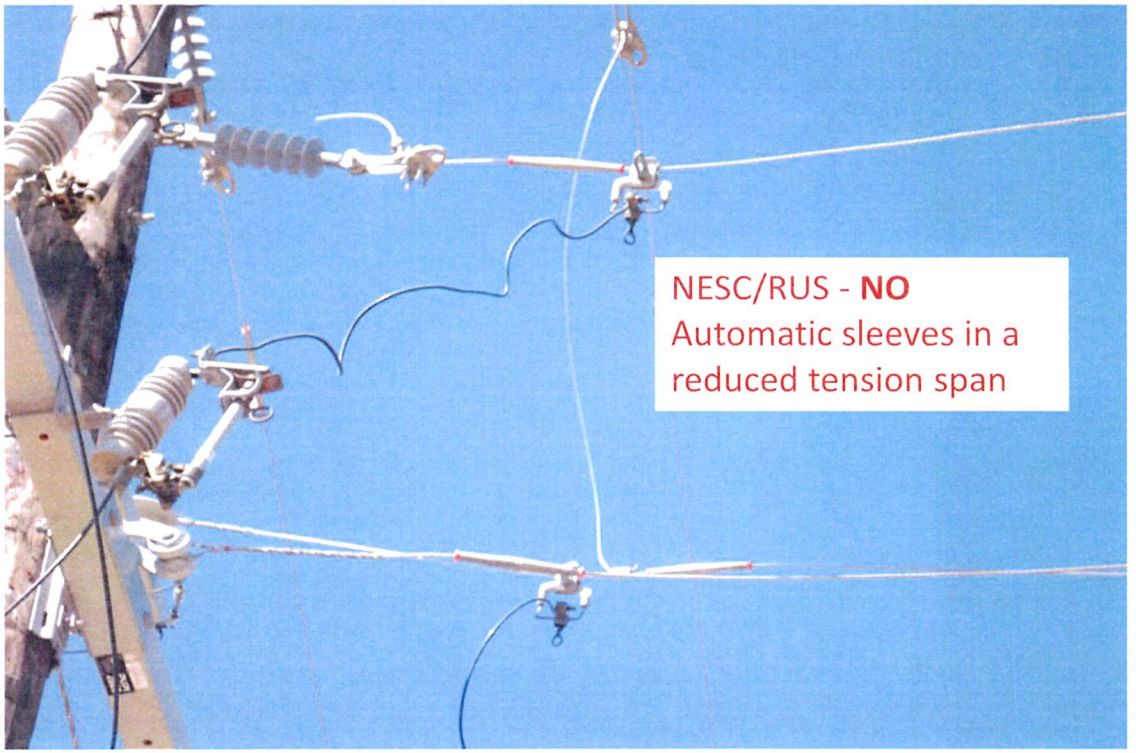
City of BRENHAM

FIND THE CODE VIOLATION



City of BRENHAM

FIND THE CODE VIOLATION



City of BRENHAM

REPORTING A HAZARD

- **Form is an example** – Can be customized to Utility
- Internally, determine **who is responsible for reporting a hazard condition** using this form
- Some entities **utilize cell phone camera and apps**
- Other entities **utilize company issued iPads and add a hazard condition reporting tab**

Date	Time

Street Address or Location

Violation (Choose One)	
	National Electric Code (NEC) *Hazard pertains to low voltage, household wiring or adopted by city code.*
	National Electric Safety Code (NESC) *Hazard pertains to Transmission & Distribution.*

Describe in detail the Hazard

Risk Level Rating (Choose One – Best Judgement)	
	Critical *Immediate action required. Access to the hazard should be restricted until the risk can be lowered to an acceptable level. Supervisor notification is required immediately.*
	High *Action needed quickly (1-2 days). The task should not proceed until your supervisor has been notified and the hazard can be assessed.*
	Moderate *Action required this week (within 5 days) to eliminate or minimize the hazard to a lower level.*
	Low *Action required within a reasonable timeframe (2-4 weeks) to eliminate or minimize the hazard.*
	Very Low *Hazard to be eliminated or lowered when possible.*

List of Witnesses			
Homeowner		Electrician	
Fellow Employee		Other	

Employee Printed Name	Employee Signature
Supervisor Printed Name	**Supervisor Signature**

City of BRENHAM

SUMMARY – HB4150

- We hope you have **learned the basics about HB4150 –**
  - **WHAT the new law covers and requires**
  - **WHO the law applies to – Your Utility!** And all T&D utilities in Texas (IOU; MOU; Cooperatives) regardless of lake crossings
  - **HOW to be in compliance –** conducting and reporting this training is one part of compliance

SUMMARY - NESC

- We hope you have **learned the basics about the NESC –**
  - **The PURPOSE of the NESC – and why it was developed**
  - **Why it's IMPORTANT to our industry**
  - **Reviewed some of the KEY RULES THAT APPLY TO COB – and relate to HB4150**
  - **A discussion of key areas of the NESC – CLEARANCES; TOP VIOLATIONS**
  - **BENEFITS of following the NESC rules and regulations**

City of BRENHAM

SUMMARY – HAZARD RECOGNITION

- We've reviewed
  - **Common HAZARDS**
  - **NESC AND NEC Rules**
  - **How to REPORT a hazard**

SUMMARY – CLOSING STATEMENT

- We cannot stress enough **the importance of each and every one you, as Qualified employees to remain vigilant and when you RECOGNIZE A HAZARD, REPORT IT AND HAVE IT FIXED**.
- **VERTICAL CLEARANCES MUST BE MAINTAINED** to those requirements stated in the National Electric Safety Code.
- **Every QUALIFIED EMPLOYEE PLAYS AN INTEGRAL PART HELPING KEEP THE PUBLIC AND YOUR PERSONNEL SAFE!**

City of BRENHAM

Thank You!

191 Menger Springs Parkway
Boerne, TX 78006

+1 830 249 3887

gpyka@se-texas.com

www.se-texas.com

SCHNEIDER ENGINEERING
ENERGY FOCUS COMMITMENT

HB4150 COMPLIANCE TRAINING

HB 4150 REVIEW - NESC REVIEW - HAZARD RECOGNITION

PREPARED BY SCHNEIDER ENGINEERING, LTD.

SCHNEIDER ENGINEERING
ENERGY. FOCUS. COMMITMENT.

NOTES REGARDING THIS PRESENTATION

- **Schneider Engineering, Ltd. is pleased to provide this training to Bandera Electric Cooperative (BEC) personnel** as part of an effort to comply with the PUCT rule implementing HB 4150, the line inspection and safety legislation signed into law following the 86th legislative session (2019).
- One aspect of the PUCT rule, is that it establishes **new reporting requirements applicable to electric utilities operating in Texas. The initial due date for all reports (applicable to your Cooperative) is May 1, 2020.**
- The reporting requirements include **one-time Reports on Training Documents and Programs. All owners of transmission and distribution facilities must file**:

  (1) **a summary description of hazard recognition training documents** provided to employees related to overhead transmission and distribution; and

  (2) **a summary description of training programs provided to employees related to the National Electric Safety Code (NESC) for construction of transmission and distribution lines**.

- **This presentation is intended for the use of Bandera Electric Cooperative, Inc.**, and should not be shared outside of the BEC organization and authorized BEC contractors.
- **The information in this presentation is for training purposes.** Any questions regarding the content of this training and the safety rules, engineering practices or construction and maintenance of BEC facilities, should be referred to your Supervisor or Manager for any clarification or further information.

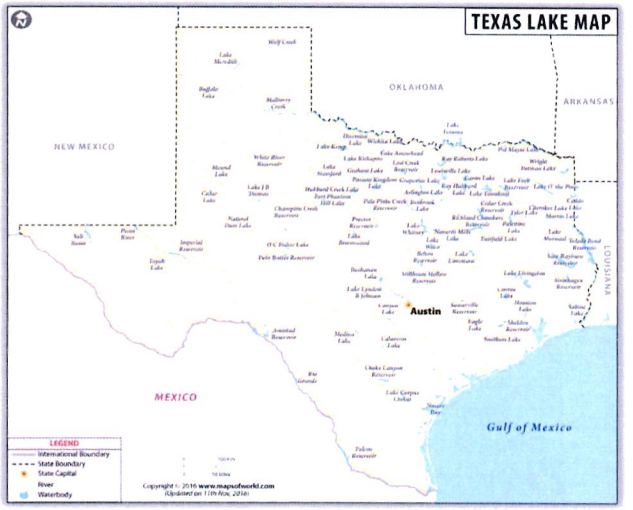
TRAINING AGENDA

- **Part 1: HB4150 Review**
  - What is HB4150?
  - Who does this new law apply to?
  - What do electric utilities need to do to attain compliance?
- **Part 2: NESC Refresher**
  - What is NESC?
  - Why NESC is important?
  - Important NESC Terms
  - Top code violations
  - Benefits of following the rules
  - NESC rule overview
  - Vertical clearances
- **Part 3: Hazard Recognition**
  - Determining what constitutes a hazard (or hazards)
  - Evaluating and Reporting a hazard (or hazards)

PART 1 – HB4150 REVIEW

WHAT IS HB4150?

House Bill 4150: William Thomas Heath Power Line Safety Act amends current law relating to safety and inspection requirements for certain utilities that provide electricity. It requires those Utilities to make regular inspections of **power lines over lakes** to ensure high-voltage carriers comply with state and federal height and safety regulations.



- The law has other inspection, training and reporting provisions that apply to all T&D utilities in Texas.
- As the name implies – this law was enacted as a result of an accident involving three Boy Scouts that were electrocuted in 2017, when the mast of their catamaran contacted a power line.

DETAILS OF HB4150

- Applies to electric utilities, **Electric Cooperatives**, and **Municipally-Owned Utilities that own or operate overhead transmission and / or distribution assets**
- **T&D lake crossing clearances over designated lakes -- must meet NESC Rule 232**
- Requires **training and reporting**

What is HB4150?

House Bill 4150: William Thomas Heath Power Line Safety Act amends current law relating to safety and inspection requirements for certain utilities that provide electricity. It requires those Utilities to make regular inspections of power lines over lakes to ensure high-voltage carriers comply with state and federal height and safety regulations.

This bill comes upon a tragedy of three Boy Scouts that were electrocuted in 2017 when the mast of their catamaran contacted a power line.

Who Does this Bill Apply To?

This bill applies to electric utilities, Municipally-Owned utilities, and Electric Cooperatives that own or operate overhead transmission and/or distribution assets.

What Reporting is Required?

EMPLOYEE TRAINING REPORT | DUE: MAY 1ST 2020*

Reporting	Applies to
▪ Summary of Hazard Recognition Training Program ▪ Summary of NESC Training Program	Transmission and Distribution

FIVE-YEAR REPORT | DUE: MAY 1ST 2020* (EVERY FIVE YEARS)

Reporting	Applies to
▪ Percentage of Facilities Inspected	Transmission > 60kV Only

ANNUAL REPORT | DUE: MAY 1ST 2020* (ANNUALLY)

Reporting	Applies to
▪ Fatalities or Injuries and Corrective Actions	Transmission > 60kV and Distribution > 1kV
▪ Occurrences of Non-Compliance	
▪ Knowledge of Non-Compliance	Transmission > 60kV Only
▪ Knowledge of Violations of Easement Agreements	

** Dates are tentative pending rule finalization.*

LET US HELP YOU MANAGE HB4150

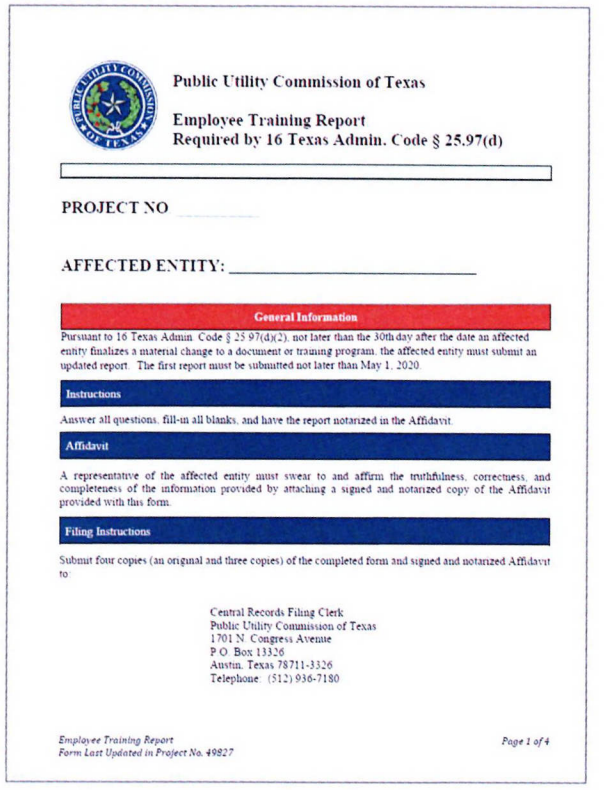
Contact us at: 830.249.3887

SCHNEIDER ENGINEERING
ENERGY. FOCUS. COMMITMENT.

BEC

HB4150 PUCT REPORTING

1. **Employee Training Report** (Transmission and Distribution)
2. **Annual Report – Fatalities and Injuries** (Transmission and Distribution)
   - Fatalities or Injuries and Corrective Action Plans
3. **Annual Report – Occurrences & Knowledge of Non-Compliance** (Transmission Only)
   - Occurrences of Non-Compliance
   - Knowledge of Non-Compliance
   - Knowledge of Violation of Easement Agreements
4. **Five Year (Inspection) Report** (Transmission Only)



Public Utility Commission of Texas

Employee Training Report
Required by 16 Texas Admin. Code § 25.97(d)

PROJECT NO _____

AFFECTED ENTITY: _____

General Information

Pursuant to 16 Texas Admin. Code § 25.97(d)(2), not later than the 30th day after the date an affected entity finalizes a material change to a document or training program, the affected entity must submit an updated report. The first report must be submitted not later than May 1, 2020.

Instructions

Answer all questions, fill-in all blanks, and have the report notarized in the Affidavit.

Affidavit

A representative of the affected entity must swear to and affirm the truthfulness, correctness, and completeness of the information provided by attaching a signed and notarized copy of the Affidavit provided with this form.

Filing Instructions

Submit four copies (an original and three copies) of the completed form and signed and notarized Affidavit to:

Central Records Filing Clerk
Public Utility Commission of Texas
1701 N. Congress Avenue
P.O. Box 13326
Austin, Texas 78711-3326
Telephone: (512) 936-7180

Employee Training Report
Form Last Updated in Project No. 49827

Page 1 of 4

EMPLOYEE TRAINING REPORT
TRANSMISSION AND DISTRIBUTION

- **One-time reporting requirement**
- **Description of hazard recognition** training of overhead distribution and transmission facilities
- **Description of training related to the National Electrical Safety Code** (NESC) for construction of distribution and transmission lines
- **Due May 1st, 2020**

BEC

ANNUAL FATALITIES OR INJURIES REPORT

- **Applies to both overhead transmission and distribution facilities**
- **Report number of fatalities and Injuries that occurred to the general public when overhead electrical equipment and lines did not meet minimum vertical clearance as stated in NESC**
- **Does not apply employees, contractors**, etc.
- **Natural disaster, weather, man-made act or force outside a utilities control are not included**
- **Corrective Action Plan to prevent reoccurrences**
- **Due May 1st, 2020**

BEC

OCCURRENCES OF NON-COMPLIANCE REPORT TRANSMISSION >60KV ONLY

- **Applies to transmission facilities greater than 60kV**
- **Occurrences of Non-Compliance** – how often (number) of times vertical clearances were not met
- **Knowledge of Non-Compliance** – did the utility know any vertical clearances were not in compliance? Yes or No? (not how often)
- **Knowledge of Violation of Easements** - did the utility know any vertical clearances with the U.S Army Corps of Engineers were not in compliance? Yes or No? (not how often)
- **Due May 1st, 2020**

BEC

FIVE-YEAR REPORT
TRANSMISSION >60KV ONLY

- **Applies to transmission facilities greater than 60kV**
- **Percentage of transmission inspected related to vertical clearance** as stated in NESC
- **No minimum percentage required**
- **Due May 1st, 2020 – every 5 years**

PART 2 – NESC REFRESHER

WHAT IS NESC?

- **National Electric Safety Code** (NESC)
- Prepared in conjunction with IEEE (Institute of Electrical and Electronic Engineers)
- Eight volunteer **subcommittees containing utility engineers, manufacturers, consultants**, etc. with an executive subcommittee and interpretations subcommittee
- **Code cycle** reviewed and **updated every 5 years**
- **Rule-making** process **open to the public**
  - Submit new rules/ recommendations via the web
- **A performance code – for the electric utility industry—plus other sectors**
- **What to do**... NOT... **How to do**
- Basic **requirements for construction** – NESC and RUS
- If Non-RUS, **NESC and Company Construction Standards**
- **Practical safeguard** of persons (workers and public)

BEC

WHY IS NESC IMPORTANT? SAFETY

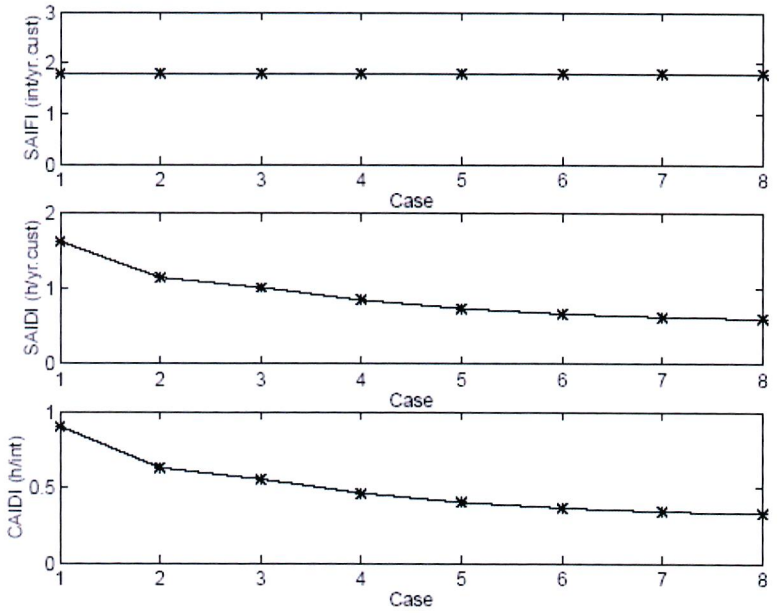
- Rules and Regulations are designed to **ensure worker and public safety**
- Rules and Regulations—Come From:
  - NESC
  - State Requirements
  - Contractual Obligations
  - Company Standards

WHY IS NESC IMPORTANT? RELATIONSHIPS

- **Governance boards** (county commissioner / city council)
- **Pole owners** (utility)
- **Joint occupancy tenants** (communications, etc.)
- Your **supervisor / managers**
- Your **work group / team / crews**

WHY IS NESC IMPORTANT? RELIABILITY

- **Proper construction standards** result in good reliability
- **Non-conforming construction and low service drops** – result in low reliability
- **Pole owner** – in some situations has the right to remove a drop that is in violation



WHY IS NESC IMPORTANT? RISK / LOSS MANAGEMENT

- **Cost** of accidents
- **Cost** of fines (OHSA) per offense
- **Cost** of re-inspections
- **Cost** of repairs or replacements
- **These types of costs impact the financial performance of the Cooperative**

BENEFITS OF FOLLOWING THE NESC - SUMMARY

1. **Safety** to you, your co-workers and the public
2. **NESC provides foundation for many types of relationships** with Boards; Pole Owners / Joint Use Tenants; Utility Managers; Your Crews / Work Teams
3. **Improve System Reliability** which translates to Member Satisfaction
4. **Stronger financial position and Reduced operating costs**

Do it right the first time.

If you find a violation – fix it or report it!

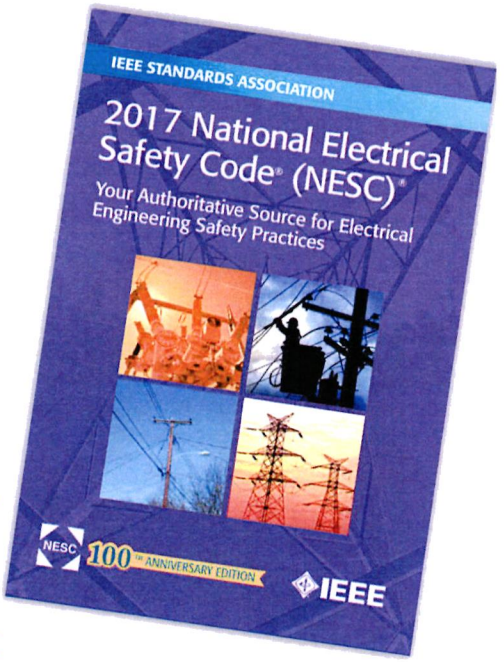
BEC

QUALIFIED PERSONNEL

- **Qualified Personnel** - Employees having been trained and demonstrate adequate knowledge of equipment and hazards to efficiently do their duties

TOP CODE VIOLATIONS

- **Vertical clearance;** the rationale behind HB4150—Vertical clearance problems and conditions can occur during construction or slowly over-time
- **Service drop clearances**; the most common violation of NESC —often resulting in home package delivery services pulling down the service drop
- **Bootleg Attachments;** this typically involves a communications company attaching to a utility guy rod not rated for the additional tension
- **Climbing spaces;** inadequate pole room to navigate & mount equipment
- **Grounding;** faulty grounding and electrolysis causing destructive corrosion

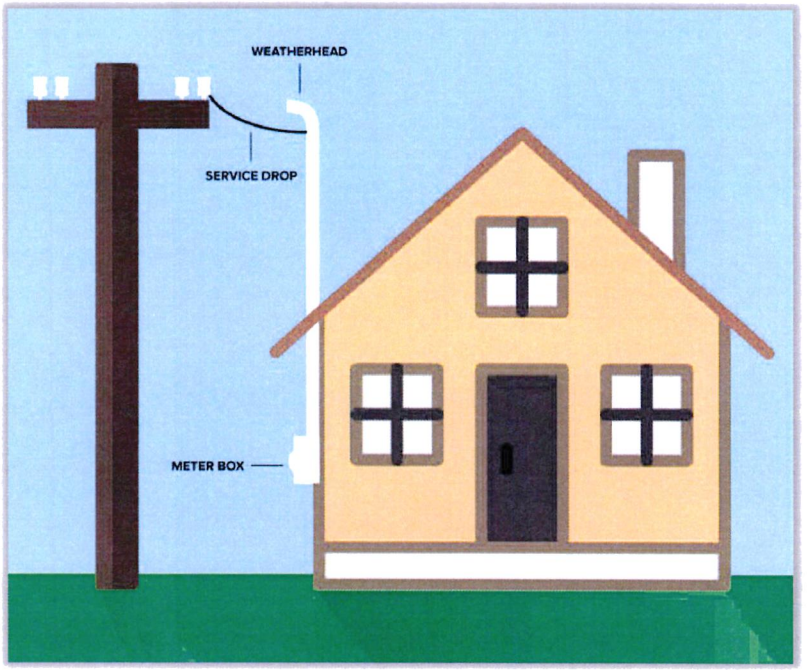


NESC SECTION 1 - 010. PURPOSE

- ✓ The purpose of these rules is **the practical safeguarding of persons during the installation, operation, or maintenance of electric supply and communication lines** and associated equipment.
- ✓ These rules contain the **basic provisions that are considered necessary for the safety of employees and the public under specified conditions**.
- ✓ This code is **not intended as a design specification or as an instruction manual**.

NESC SECTION 1 - 011. SCOPE

- **NESC covers to service point of Co-op's point of demarcation[1].**
- NEC code is applied from this point on.
  - **[1]Point of connection between utility and premises wiring**
- **Weatherhead** on overhead service
- **Meter base** on underground service



NESC SECTION 1 - 012. GENERAL RULES

The utility performing design, construction operation, **or** maintenance tasks for electric supply or equipment covered by this Code **shall be responsible for meeting the applicable rules.**

- **All qualified personnel at the utility are responsible** for meeting the requirements of the rules

THIS MEANS YOU

BEC

NESC SECTION 1 - 013. APPLICATION - EXISTING FACILITIES

- **Existing facilities need not comply with new code**
- **When modifying existing facilities:**
  1. Meet code when structure was originally built
  2. Meet code that applied to structure when previous modification/upgrades were completed, or
  3. Met the 2017 NESC Code
- **The 2017 NESC added reference to Rule 202 which requires Rule 238C be met when pole replaced** (Meet the 40-inch separation between power and communications)

BEC

NESC SECTION 1 -013. APPLICATION 013C. INSPECTION AND WORK RULES

- New to the 2017 NESC
- **"Inspection rules and work rules in the current edition of the NESC shall apply to inspection of or work on all new and existing installations."**

BEC

SECTION 23 - RULE 232. CLEARANCES (APPLIES TO HB4150)

- **Vertical clearances of wires, conductors, cables, and equipment aboveground, roadway, rail, or water surfaces**
  - Vertical clearances for wires as shown on Table 232-1
    - Separate tables for Metric (m., page 99) and English (ft., page 103)
  - Vertical clearances for equipment as shown on Table 232-2
    - Separate tables for Metric (m., page 107) and English (ft., page 110)

SECTION 23 - RULE 232B4. STREET AND AREA LIGHTING

- Vertical clearances as shown on Table 232-2
- Grounded luminaire considered an "effectively grounded" equipment case
- Ungrounded luminaire considered a "rigid live part"
- Exception: post-mounted luminaire with grounded or entirely dielectric cases

SECTION 23 - RULE 233. CLEARANCE BETWEEN WIRES, CONDUCTORS, AND CABLES ON DIFFERENT STRUCTURES

- 233A (General) - Crossing to be made on a common support structure, where practicable. Where not practical, follow Rule 233B and C.
  - 233B1 - Horizontal distance – no less than 5 feet.
  - 233C1 – Vertical Clearance – shall not be less than that shown in Table 233-1

DISTRIBUTION VERTICAL CLEARANCES TABLE 232-1

Primary Conductors 14.4/24.9 kV

Vertical Clearances (feet)

All clearances are with conductors under maximum sag conditions. (See sag charts)

1	Railroads	Phase	26.5 (NESC)
		Neutral	23.5 (NESC)
2	Public streets, alleys, roads	Phase	18.5 (NESC)
	Not TXDOT controlled	Neutral	15.5 (NESC)
	TXDOT controlled	All Conductors	22.0 (State)
3	Commercial driveways, parking lots, and other areas subject to truck traffic.	Phase	18.5 (NESC)
		Neutral	15.5 (NESC)
4	Residential driveways	Phase	18.5 (NESC)
		Neutral	15.5 (NESC)

DISTRIBUTION VERTICAL CLEARANCES TABLE 232-1

5	Other land traversed by vehicles such as cultivated, grazing, forest, orchards, industrial and commercial sites etc.	Phase Neutral	18.5 (NESC) 15.5 (NESC)
	When designing a line where oversized vehicles, equipment is in use, these clearances shall be increased by the difference between 14' and the height of the equipment. This includes oil field equipment.		
6	Water areas not suitable for sail boating	Phase Neutral	17.0 (NESC) 14.0 (NESC)
7	Water areas for sail boating including lakes, ponds, and rivers.		
	a. Less than 20 acres	Phase Neutral	20.5 (NESC) 17.5 (NESC)
	b. 20 to 200 acres	Phase Neutral	28.5 (NESC) 25.5 (NESC)
	c. Over 200 to 2,000 acres	Phase Neutral	34.5 (NESC) 31.5 (NESC)
	d. Over 2,000 acres	Phase Neutral	40.5 (NESC) 37.5 (NESC)

TRANSMISSION VERTICAL CLEARANCES TABLE 232C-1A

Primary Conductors 69.0/138.0 kV

Vertical Clearances (feet)

All clearances are with conductors under maximum sag conditions. (See sag charts)

			69kV	138kV
1	Railroads	Phase	28.0 (NESC)	30.5 (NESC)
		Neutral	25.0 (NESC)	27.5 (NESC)
2	Public streets, alleys, roads	Phase	20.0 (NESC)	22.5 (NESC)
	Not TXDOT controlled	Neutral	17.0 (NESC)	19.5 (NESC)
	TXDOT controlled	All Conductors	23.5 (State)	26.0 (NESC)
3	Commercial driveways, parking lots, and other areas subject to truck traffic.	Phase	20.0 (NESC)	22.5 (NESC)
		Neutral	17.0 (NESC)	19.5 (NESC)
4	Residential driveways	Phase	20.0 (NESC)	22.5 (NESC)
		Neutral	17.0 (NESC)	19.5 (NESC)

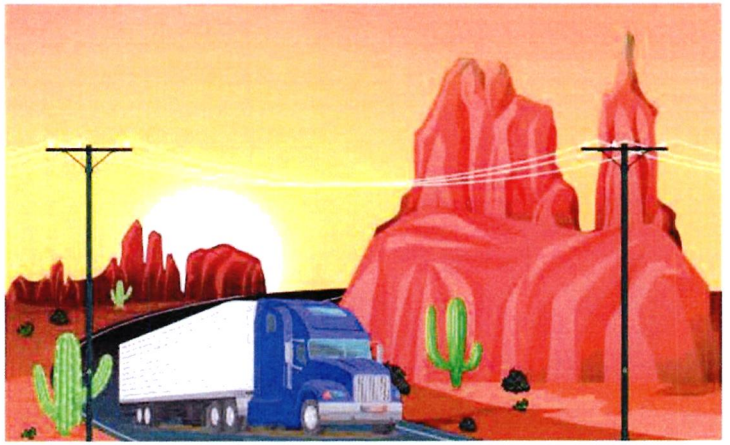
BEC

TRANSMISSION VERTICAL CLEARANCES TABLE 232C-1A

			69kV	138kV
5	Other land traversed by vehicles such as cultivated, grazing forest, orchards, etc.	Phase	20.0 (NESC)	22.5 (NESC)
		Neutral	17.0 (NESC)	19.5 (NESC)
	When designing a line where oversized vehicles, equipment is in use, these clearances shall be increased by the difference between 14' and the height of the equipment. This includes oil field equipment.			
6	Water areas not suitable for sail boating	Phase	18.5 (NESC)	21.0 (NESC)
		Neutral	15.5 (NESC)	18.0 (NESC)
7	Water areas for sail boating including lakes, ponds, and rivers.			
	a. Less than 20 acres	Phase	22.0 (NESC)	24.5 (NESC)
		Neutral	19.0 (NESC)	21.5 (NESC)
	b. 20 to 200 acres	Phase	30.0 (NESC)	32.5 (NESC)
		Neutral	27.0 (NESC)	29.5 (NESC)
	c. Over 200 to 2,000 acres	Phase	36.0 (NESC)	38.5 (NESC)
		Neutral	33.0 (NESC)	35.5 (NESC)
	d. Over 2,000 acres	Phase	42.0 (NESC)	44.5 (NESC)
		Neutral	39.0 (NESC)	41.5 (NESC)

DISTRIBUTION VERTICAL CLEARANCES

TRUCKS OVER 8 FEET

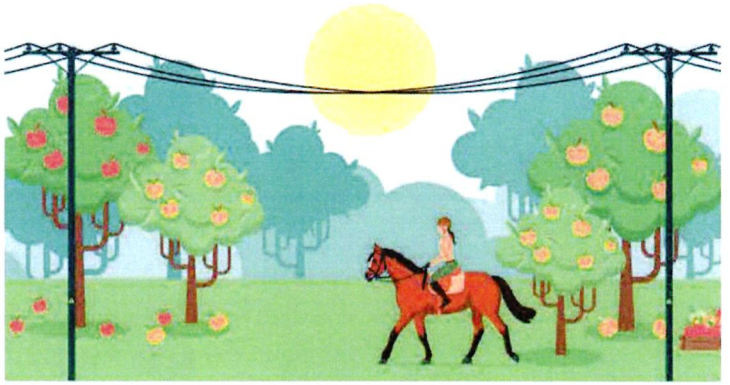


Vertical Clearance at Largest Vertical Sag

Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
15.5 ft.		16.0 ft.	18.5 ft.				

Department of Transportation may require greater clearance.

OVER FIELDS, ORCHARDS, FOREST, ETC.



Vertical Clearance at Largest Vertical Sag

Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
15.5 ft.		16.0 ft.	18.5 ft.				

Used by vehicles over 8 feet tall or riders on horseback.

DISTRIBUTION VERTICAL CLEARANCES

RAILROADS

Vertical Clearance at Largest Vertical Sag							
Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
23.5 ft.		24.0 ft.	26.5 ft.				

Railroad company may require greater clearance.

VEHICLES GREATER THAN 14 FT. IN HEIGHT

Vertical Clearance at Largest Vertical Sag							
Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
X + 1.5 ft.		X + 2 ft.	X + 4.0 ft.				

X = Height of oversized vehicle.

DISTRIBUTION VERTICAL CLEARANCES

WATER (NO SAILBOATS)

Vertical Clearance at Largest Vertical Sag							
Neutral or Comm.	Grounded Span Guy	TPX	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
14.0 ft.		14.5 ft.	17 ft.				

WATER (FOR SAILBOATING)

Vertical Clearance at Largest Vertical Sag							
	Neutral or Comm.	Grounded Span Guy	7.2/12.5 kV	14.4/25 kV	19.9/35 kV	69 kV	138 kV
<20 Acres	17.5 ft.		20.5 ft.				
20-200 Acres	25.5 ft.		28.5 ft.				
>200-2,000 Acres	31.5 ft.		34.5 ft.				
>2,000 Acres	37.5 ft.		40.5 ft.				

PART 3 – HAZARD RECOGNITION

FOR INSTALLATION AND MAINTENANCE OF OVERHEAD ELECTRIC SUPPLY AND COMMUNICATION LINES

WHAT IS AN ELECTRICAL HAZARD?

"A dangerous condition where a person can or does make electrical contact with energized equipment or a conductor. From that contact, the person may sustain an injury from shock, where there is a potential to receive an arc-flash burn, thermal burn, or blast injury."

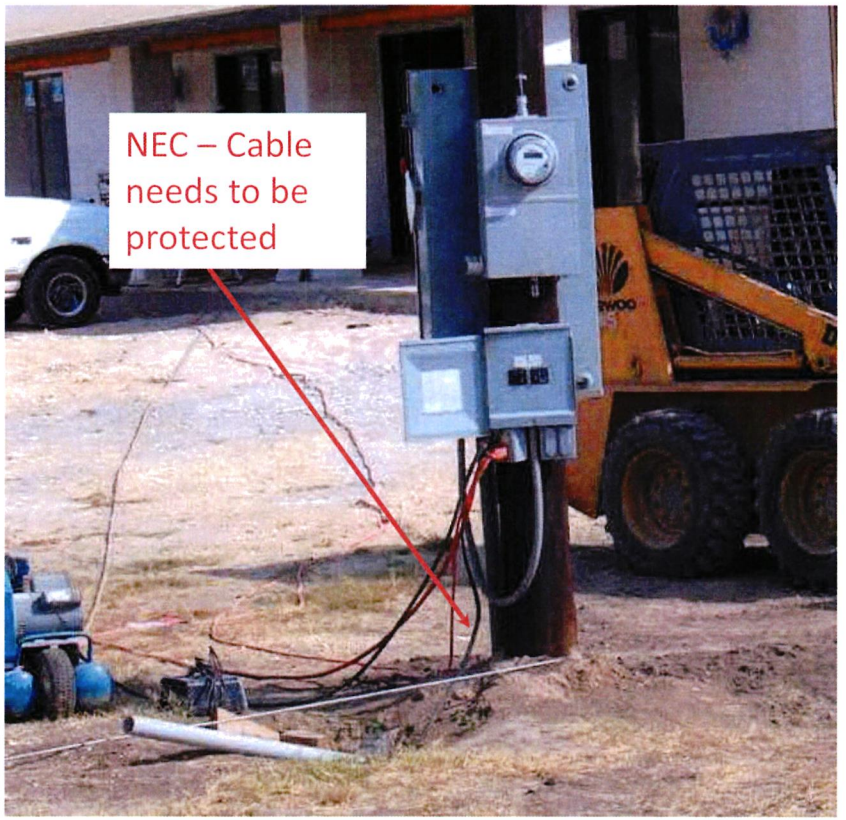
Engineers, electricians, and overhead line workers are at the top of the list of professionals who are most exposed to electrical hazards.

However, electrical hazards can come in all forms (low voltage, i.e. behind the meter) and people who are indirectly working with electricity are also exposed to electrical hazards.

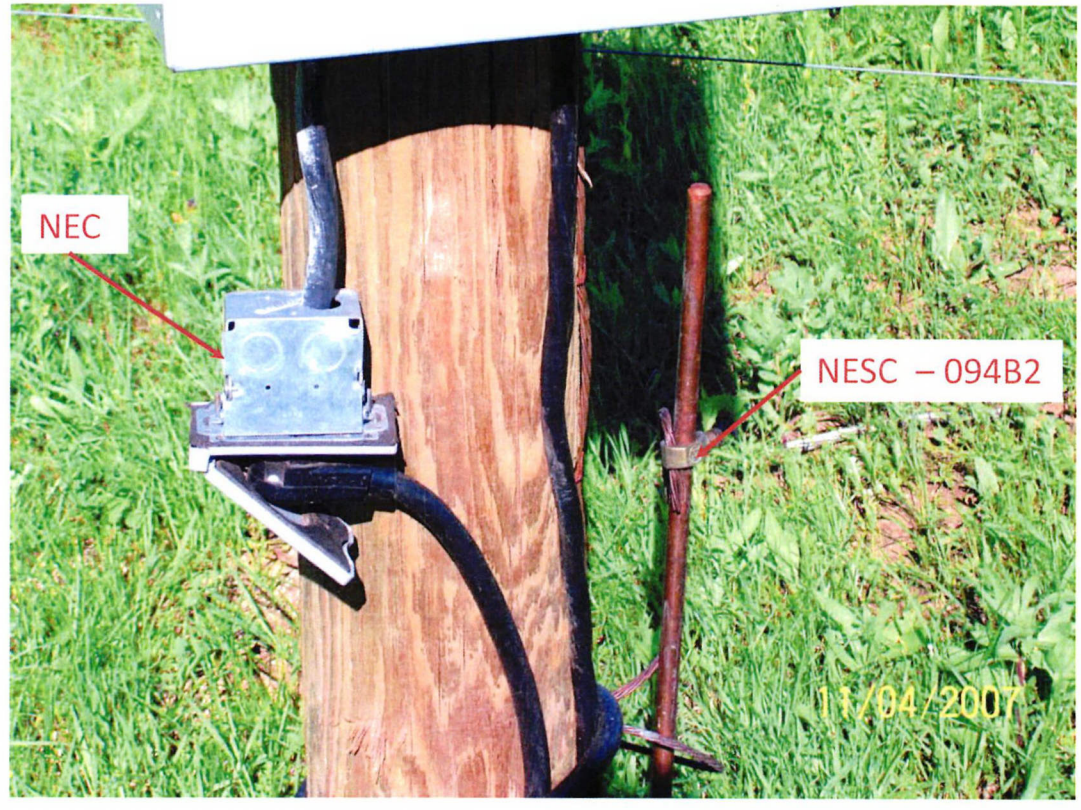
HAZARD CATEGORIES

- Lack of clearance
- Damaged / Misuse of equipment
- Inadequate wiring and overloaded circuits
- Exposed electrical parts
- Improper grounding
- Damaged insulation
- Personal Protective Equipment (PPE)
- Weather / Wet conditions

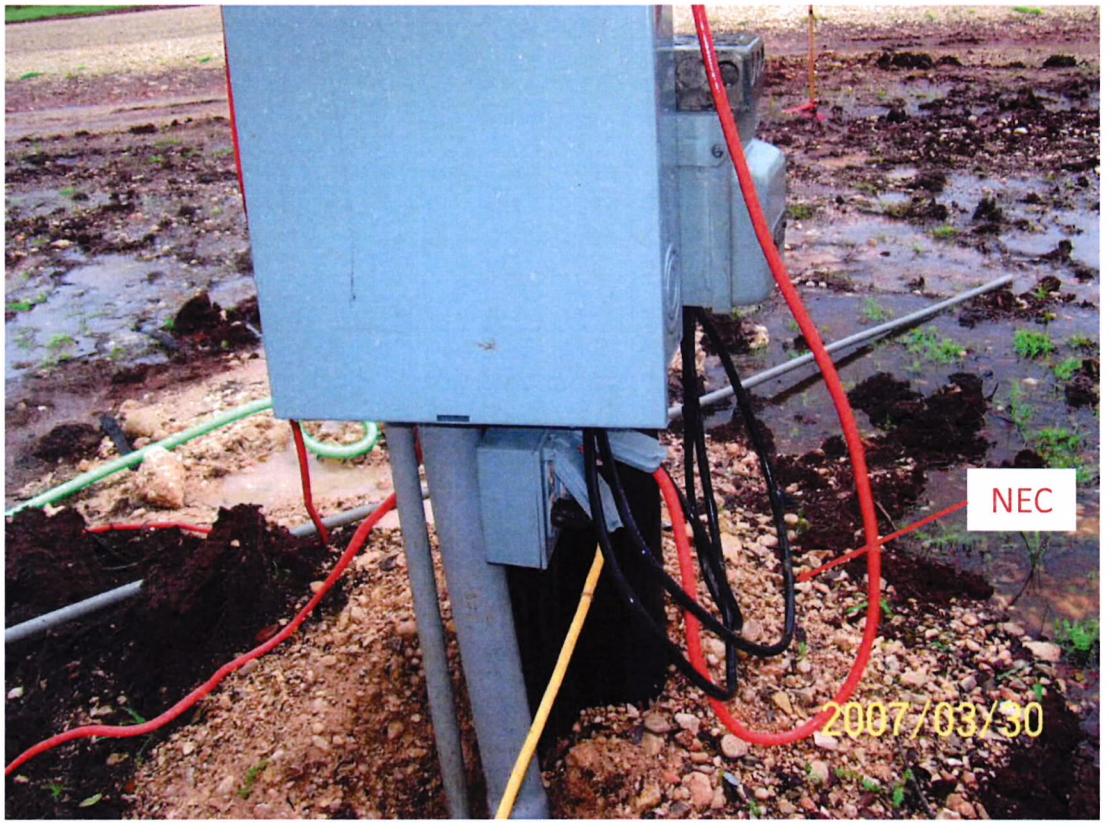
FIND THE CODE VIOLATION



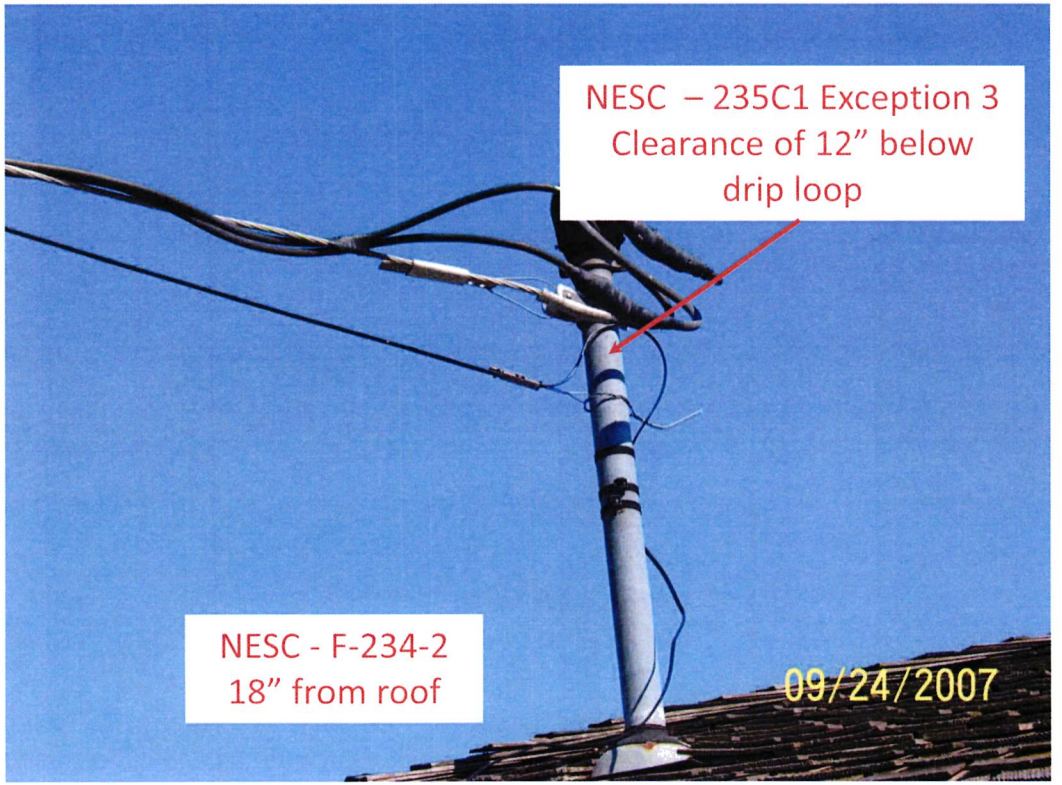
FIND THE CODE VIOLATION



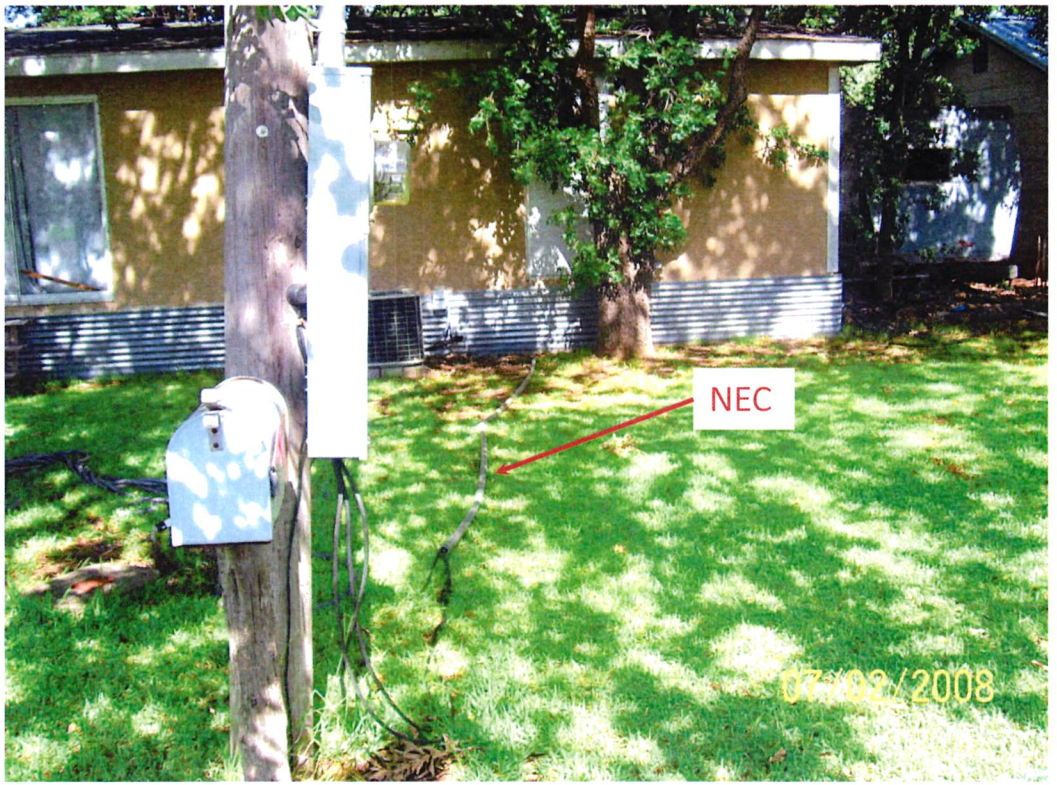
FIND THE CODE VIOLATION



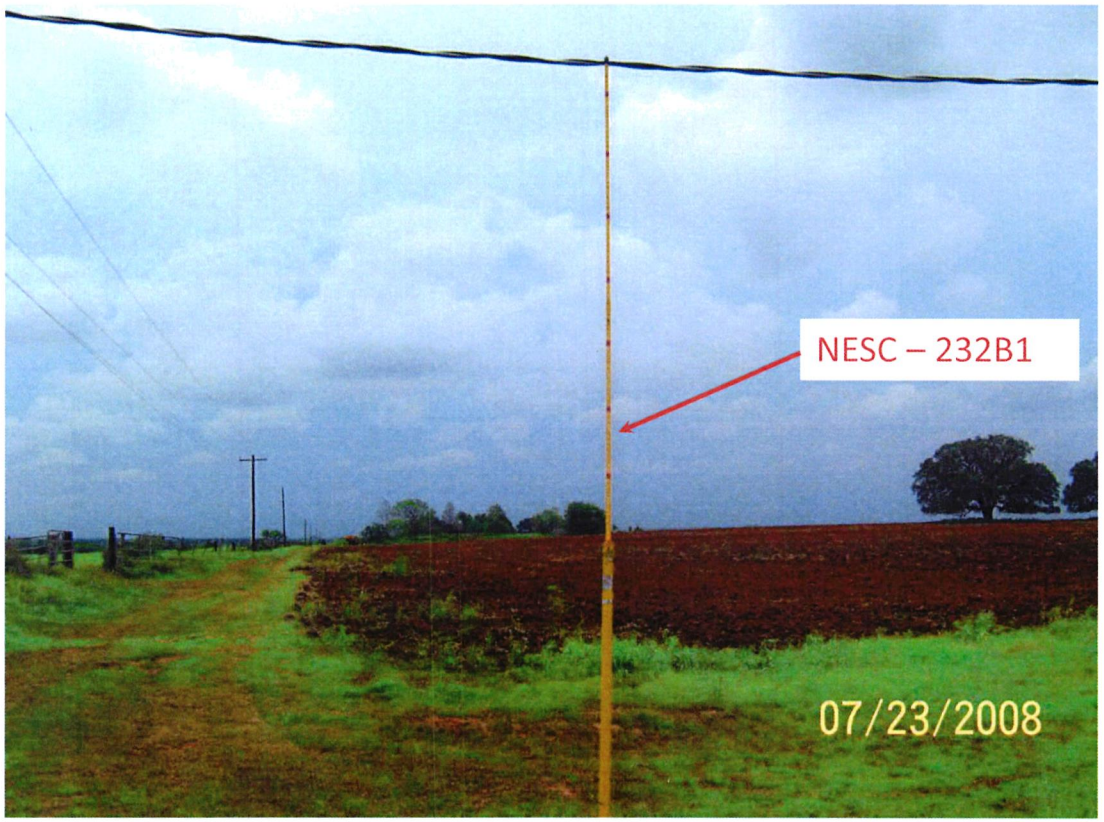
FIND THE CODE VIOLATION



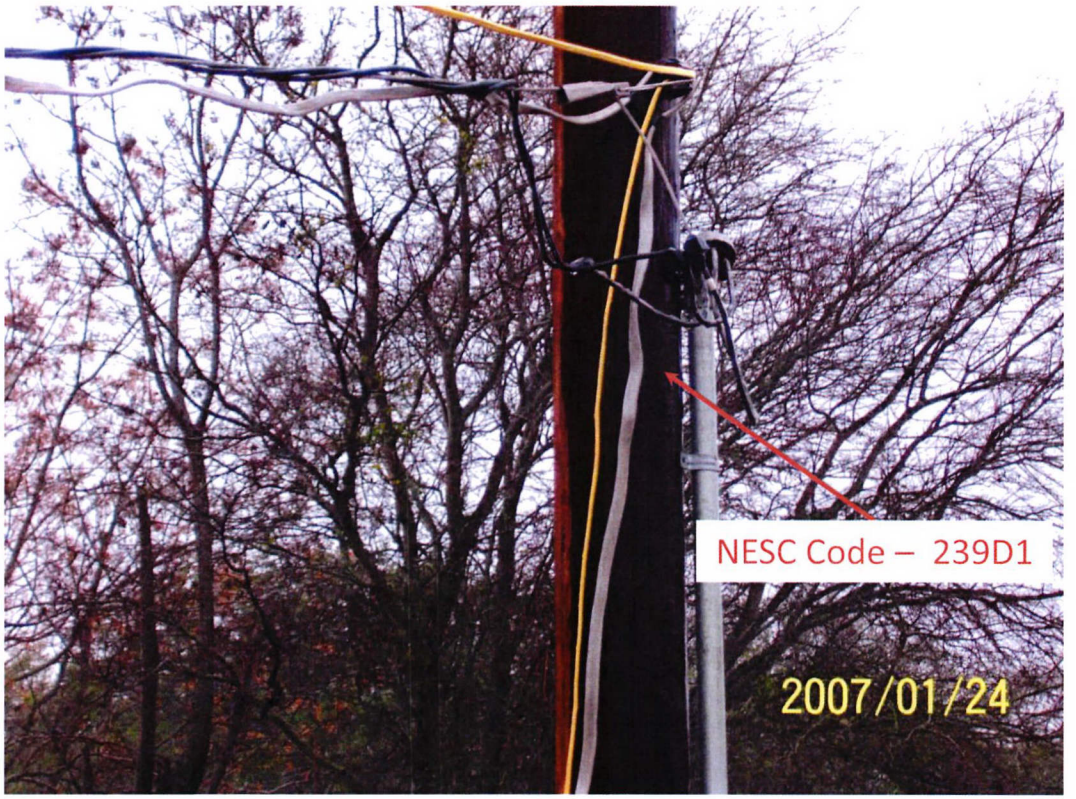
FIND THE CODE VIOLATION



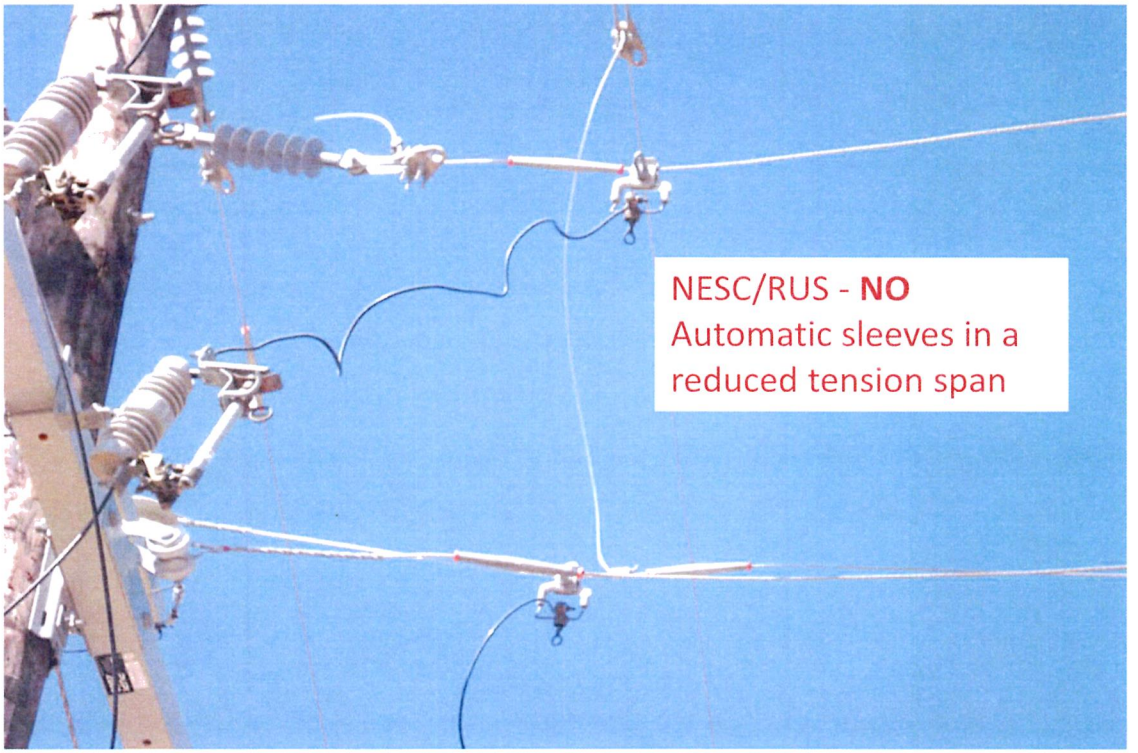
FIND THE CODE VIOLATION



FIND THE CODE VIOLATION



FIND THE CODE VIOLATION



REPORTING A HAZARD

- **Form is an example** – Can be customized to Utility
- Internally, determine **who is responsible for reporting a hazard condition** using this form
- Some entities **utilize cell phone camera and apps**
- Other entities **utilize company issued iPads and add a hazard condition reporting tab**

DATE	TIME

STREET ADDRESS OR LOCATION

VIOLATION (CHOOSE ONE)	
	National Electric Code (NEC) *Hazard pertains to low voltage, household wiring or adopted by city code.*
	National Electric Safety Code (NESC) *Hazard pertains to Transmission & Distribution*

DESCRIBE IN DETAIL THE HAZARD

RISK LEVEL RATING (CHOOSE ONE – BEST JUDGEMENT)	
	Critical *Immediate action required. Access to the hazard should be restricted until the risk can be lowered to an acceptable level.* *Supervisor notification is required immediately*
	High *Action needed quickly (1-2 days). The task should not proceed until your supervisor has been notified and the hazard can be assessed*
	Moderate *Action required this week (within 5 days) to eliminate or minimize the hazard to a lower level.*
	Low *Action required within a reasonable timeframe (2-4 weeks) to eliminate or minimize the hazard*
	Very Low *Hazard to be eliminated or lowered when possible.*

LIST OF WITNESSES			
Homeowner		Electrician	
Fellow Employee		Other	

EMPLOYEE PRINTED NAME	EMPLOYEE SIGNATURE
SUPERVISOR PRINTED NAME	SUPERVISOR SIGNATURE

SUMMARY – HB4150

- We hope you have **learned the basics about HB4150 –**
  - **WHAT the new law covers and requires**
  - **WHO the law applies to – Your Cooperative!** And all T&D utilities in Texas (IOU; MOU; Cooperatives) regardless of lake crossings
  - **HOW to be in compliance –** conducting and reporting this training is one part of compliance

SUMMARY - NESC

- We hope you have **learned the basics about the NESC –**
  - **The PURPOSE of the NESC – and why it was developed**
  - **Why it's IMPORTANT to our industry**
  - **Reviewed some of the KEY RULES THAT APPLY TO BEC – and relate to HB4150**
  - **A discussion of key areas of the NESC – CLEARANCES; TOP VIOLATIONS**
  - **BENEFITS of following the NESC rules and regulations**

SUMMARY – HAZARD RECOGNITION

- We've reviewed
  - **Common HAZARDS**
  - **NESC AND NEC Rules**
  - **How to REPORT a hazard**

SUMMARY – CLOSING STATEMENT

- We cannot stress enough **the importance of each and every one you, as Qualified employees to remain vigilant and when you RECOGNIZE A HAZARD, REPORT IT AND HAVE IT FIXED**.
- **VERTICAL CLEARANCES MUST BE MAINTAINED** to those requirements stated in the National Electric Safety Code.
- **Every QUALIFIED EMPLOYEE PLAYS AN INTEGRAL PART HELPING KEEP THE PUBLIC AND YOUR PERSONNEL SAFE!**

BEC

Thank You!

191 Menger Springs Parkway
Boerne, TX 78006

+1 830 249 3887

gpyka@se-texas com

www se-texas.com

SCHNEIDER ENGINEERING
ENERGY FOCUS COMMITMENT